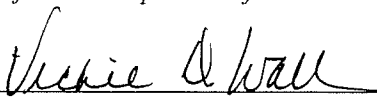


PATENT

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Vickie D. Wall

Applicant : Chang-Seob Kim, et al. Confirmation No. 6732
Application No. : 10/748,197
Filed : December 31, 2003
Title : JELLY-ROLL TYPE BATTERY UNIT AND WINDING METHOD
THEREOF AND LITHIUM SECONDARY BATTERY COMPRISING
THE SAME

Grp./Div. : 1727
Examiner : Maria J. Laios

Docket No. : 66249/L550

APPELLANT'S BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Post Office Box 7068
Pasadena, CA 91109-7068
August 11, 2011

Commissioner:

1. REAL PARTY IN INTEREST

The real party in interest is Samsung SDI Co., Ltd.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 1-3, 5, 6, 8, 12, 14, 20-22, and 24-28 have been rejected. The rejection of each of the claims 1-3, 6, 8, 12, 14, 20-22, and 24-28 is appealed.

4. STATUS OF AMENDMENTS

No amendments were filed subsequent to the March 17, 2011 Final Office Action.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Claims 1–3, 5, 6, 8, 12, 14, 20–22, and 24–28 have been rejected and are appealed. Of these claims, claims 1, 8, 14, and 20 are independent. A concise explanation of the subject matter defined in each of the independent claims is for the Board's convenience, as required by 37 C.F.R. § 41.37(c)(1)(v), and is not intended and should not be used to interpret the language of the claims or to broaden or narrow the scope of the claims. References to the specification and drawings are also provided as examples and for the Board's convenience, as required by 37 C.F.R. § 41.37(c)(1)(v), but they are not intended and should not be interpreted to be a necessarily complete recitation of all instances in the specification and drawings relevant to the claim element(s) to which the references correspond. Similarly, references to the specification or drawings do not imply that the portions referenced necessarily fall within or without the scope of the claim element(s) corresponding to such reference.

Claim 1 is directed to a battery unit. *Title, page 6, paragraph [0029]*. The battery unit comprises: a first electrode plate (36) having a first electrode current collector (410) with a first electrode tab (430), and a first electrode active material layer (420) coated on at least one surface of the first electrode current collector; a second electrode plate (35) having a second electrode current collector (41) with a second electrode tab (43), and a second electrode active material layer (42) coated on at least one surface of the second electrode current collector; and a separator (37) that is interposed between the first electrode plate and the second electrode plate, wherein, the first electrode tab is formed by folding a cut portion of an uncoated area of the first electrode current collector toward an upper edge thereof, the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector, and a fold extending from the side edge to the cut, and the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, at an innermost layer

of the battery unit, and partially overlaps and faces the second electrode tab. *Pages 7–8, paragraphs [0036]–[0042] and FIGS. 5, 6A, 6B, and 6C.*

Claim 8 is directed to a method of winding a battery unit comprising: forming a first electrode plate (36) having a first electrode current collector (410) with a first electrode tab (430) formed at a winding start portion of the first electrode current collector, wherein the first electrode tab is formed by folding a cut portion (*FIGS. 6B and 6C*) of the first electrode current collector toward an upper edge thereof, and the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of the width of the first electrode current collector, and a fold extending from the side edge to the cut; forming a second electrode plate (35) having a second electrode current collector (41) with a second electrode tab (43) attached thereto; preparing a separator (37) interposed between the first and second electrode plates; and winding the first and second electrode plates together, with the separator interposed therebetween, wherein the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab. *Pages 7–8, paragraphs [0036]–[0042], page 9–10, paragraphs [0048]–[0055], and FIGS. 5, 6A, 6B, and 6C.*

Claim 14 is directed to a lithium secondary battery comprising: a battery unit having a first electrode plate (36) having a first electrode tab (430), a separator (37) and a second electrode plate (35) of an opposite polarity to the first electrode plate, the second electrode plate having a second electrode tab (43), sequentially disposed; a can (31) having a space in which the battery unit is housed; and a cap assembly (300) connected to an upper portion of the can, and having a cap plate (310) and an electrode terminal (330) connected to the cap plate through a terminal throughhole (311) formed in the cap plate and having a gasket (320) at an outer surface for insulation from the cap plate, wherein, the first electrode plate includes a first electrode current collector (410) having a first electrode tab (430) formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, and a first electrode active material (420) coated on at least one plane of the first electrode current collector, the cut portion being

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defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector, and a fold extending from the side edge to the cut, and the second electrode plate includes a second electrode current collector (41) with a second electrode tab (43) attached thereto, and a second electrode active material (42) coated on at least one plane of the second electrode current collector, and the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab. *Pages 7–8, paragraphs [0036]–[0042] and FIGS. 5, 6A, 6B, and 6C.*

Claim 20 is directed to a battery unit comprising: a first tri-functional electrode unit comprising a first electrode plate (36) having a first electrode current collector (410) with a first electrode tab (430), and a first electrode active material layer (420) coated on at least one surface of the first electrode current collector; a second tri-functional electrode unit comprising a second electrode plate (35) having a second electrode current collector (41) with a second electrode tab (43), and a second electrode active material layer (42) coated on at least one surface of the second electrode current collector; and a separator (37) interposed between the first tri-functional electrode unit and the second tri-functional electrode unit, wherein, the separator is interposed between the first electrode plate and the second electrode plate, the first tri-functional electrode unit and the second tri-functional electrode unit are wound, with the separator therebetween, to form the battery unit, the first electrode tab is incorporated into the electrode current collector in an area of the first electrode plate where the corresponding electrode active material layer is not coated, the first electrode tab is formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, the cut portion being defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of the width of the first electrode current collector, and a fold extending from the side edge to the cut, such that the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an

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innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.
Pages 7–8, paragraphs [0036]–[0042] and FIGS. 5, 6A, 6B, and 6C.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether the Examiner erred in rejecting claims 1–3, 8, 14, 20, and 24–26 under 35 U.S.C. § 103 as being unpatentable over Narukawa et al. (U.S. Pat. No. 5,834,133, hereinafter “Narukawa ‘133”) in view of Vourlis (U.S. Pat. No. 6,054,233, hereinafter “Vourlis”).

Whether the Examiner erred in rejecting claims 5, 6, 12, 21, 22, 27, and 28 under 35 U.S.C. § 103 as being unpatentable over Narukawa ‘133 in view of Vourlis and further in view of Narukawa et al. (U.S. Pat. No. 5,508,122, hereinafter “Narukawa ‘122”).

7. ARGUMENT

Appellants respectfully submit that claims 1–3, 5, 6, 8, 12, 14, 20–22, and 24–28 were erroneously rejected under 35 U.S.C. § 103(a) as being unpatentable over Narukawa ‘133, Vourlis, and Narukawa ‘122.

A. Narukawa ‘133 and Vourlis do not disclose or suggest the limitations of independent claims 1, 8, 14, and 20 and dependent claims 2, 3, and 24–26

1. Narukawa ‘133 and Vourlis do not disclose or suggest a cut that begins at the lower edge and extends more than half of the width of the first electrode

Claim 1 recites, in relevant part (emphasis added):

the first electrode tab is formed by folding a cut portion of an uncoated area of the first electrode current collector toward an upper edge thereof,

the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector

Similarly, claim 8 recites, in relevant part (emphasis added):

forming a first electrode plate having a first electrode current collector with a first electrode tab formed at a winding start portion of the first electrode current collector, wherein the first electrode tab is formed by folding a cut portion of the first electrode current

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collector toward an upper edge thereof, and the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of the width of the first electrode current collector

Claim 14 recites, in relevant part (emphasis added):

the first electrode plate includes a first electrode current collector having a first electrode tab formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, and a first electrode active material coated on at least one plane of the first electrode current collector, the cut portion being defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector

Claim 20 recites, in relevant part (emphasis added):

the first electrode tab is formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, the cut portion being defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of the width of the first electrode current collector

Applicants respectfully submit that the cited portions of the cited references do not appear to disclose or suggest at least the above recited limitations of claims 1, 8, 14, and 20.

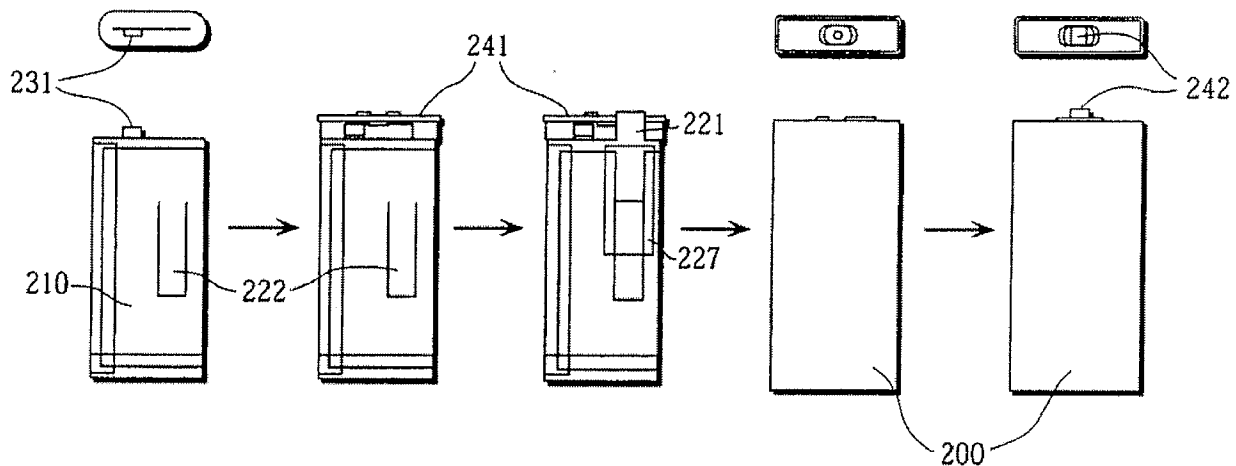
Page 3 of the Office action recites, in relevant part:

The positive electrode tab (222) is formed by folding a cut portion of an uncoated area of the positive current collector (224) toward an upper edge of the electrode (Figure 8).

Therefore, the Office action appears to equate the “first electrode tab” of the claims of the present application with the “positive electrode tab 222” of Narukawa ‘133 and appears to equate the “first electrode plate” of the claims of the present application with the “positive current collector 224” of Narukawa ‘133.

FIG. 8 of Narukawa '133 is reproduced below:

Fig. 8



Page 3 of the Office action goes on to state:

Narukawa et al. does not explicitly state that the cut portion begins at the lower edge of the current collector and extends along more than half the width; but Narukawa et al. teaches that the tab can be cut to size (col. 12 lines 42-44).

However, column 12, lines 42-44 of Narukawa '133 merely recite (emphasis added):

If the positive electrode collector tab is too long, a portion thereof projecting from the upper face of the sealing plate is trimmed.

In addition, column 9, lines 59-61 of Narukawa '133 recites (emphasis added):

A U-shaped incision portion 222 defined by three incision lines extending through the positive-current collector is formed in the two-side current collector-exposed portion.

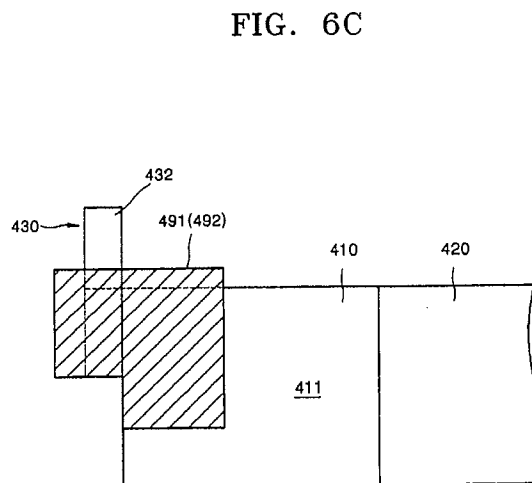
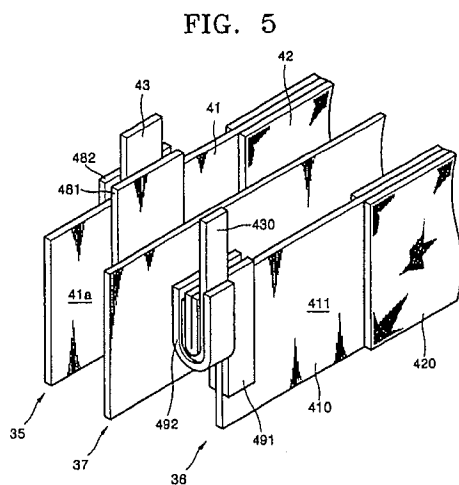
Therefore, the cited portions of Narukawa '133 do not appear to disclose or suggest at least the above recited limitations of claims 1, 8, 13, and 20 because the cited portion of Narukawa '133 merely appear to disclose that the end of the electrode tab can be cut off if it is "too long" and does not appear to disclose or suggest "a cut that begins at the lower edge and extends more than half of the width of the first electrode" of the claimed embodiments of claims 1, 8, 14, and 20.

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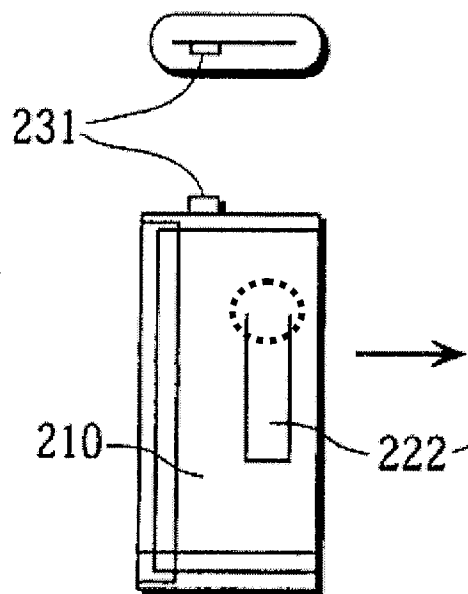
In addition, claims 1, 8, 14, and 20 recite, in relevant part:

a fold extending from the side edge to the cut

This limitation is illustrated, for example, in FIGS. 5 and 6C (reproduced below) of the application as filed.



A portion of FIG. 8 of Narukawa '133 is annotated and reproduced below:



Appellants respectfully submit that a person of ordinary skill in the art at the time the invention was made would have understood that the “positive electrode tab 222” would be folded

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in the circled region in the annotated version of FIG. 8 of Narukawa '133 above, as described, for example, in column 12, lines 4–6 of Narukawa '133.

However, as shown in annotated portion of FIG. 8 of Narukawa '133 reproduced above, the folded portion of Narukawa '133 does not appear to be “a fold extending from the side edge to the cut” of the claimed embodiments of claims 1, 8, 14, and 20 because a portion of the distance between the “positive electrode tab 222” and the side edge would not be folded (e.g., the portion of the “positive current collector 224” to the right of the dotted circle).

2. Narukawa '133 and Vourlis do not disclose or suggest a first electrode tab disposed at substantially the center of the battery unit, at an innermost layer of the battery unit

Claim 1 recites, in relevant part (emphasis added):

the first electrode tab is formed by folding a cut portion of an uncoated area of the first electrode current collector toward an upper edge thereof,

...

the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, at an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.

Independent claims 8, 14, and 20 recite substantially similar limitations.

Appellants respectfully submit that the cited references do not appear to disclose or suggest at least the above emphasized limitations of claims 1, 8, 14, and 20.

Pages 3–4 of the Office action recite, in relevant part:

Narukawa et al. discloses the cut tab of the positive electrode is located on the outer surface of the electrode assembly (Figures 6 and 8) but does not disclose that the tab formed by folding is located substantially in the center of the battery electrode unit, at the innermost layer of the electrode unit. However this would be within the skill of an ordinary artisan start the winding electrode unit with the folded portion since this would apply pressure to the folded area and since there is an infinite number of predictable solutions.

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Therefore, the “positive electrode collector tab 221” formed from the “incision portion 222” of Narukawa ‘133 appears to be equated with the “first electrode tab” of claims 1, 8, 14, and 20.

However, Appellants respectfully submit that there is no apparent reason why a person of ordinary skill in the art at the time the invention was made would have modified Narukawa ‘133 to arrive at the claimed embodiments of claims 1, 8, 14, and 20, which include the above limitations.

For example, column 9, lines 59–61 of Narukawa ‘133 recite (emphasis added):

A U-shaped incision portion 222 defined by three incision lines extending through the positive-current collector is formed in the two-side current collector-exposed portion.

Furthermore, column 10, lines 28–39 recite (emphasis added):

The positive-electrode plate 220 and the negative-electrode plate 230 are rolled with the separator 250 of polyethylene interposed therebetween to form the electrode roll 210 such that the one-side current collector-exposed portion of the positive-electrode plate 220 faces outward and the two-side current collector-exposed portion thereof is located on the outermost periphery of the electrode roll 210. This permits the current collector-exposed portion to come in contact with the interior surface of the battery casing, thereby providing electrical connection between the positive electrode plate and the battery casing also functioning as a positive-electrode external terminal.

Therefore, because the “incision portion 222” is formed on the “two-side current collector-exposed portion” and because the “two-side current collector-exposed portion” is described as being located at an “outermost periphery of the electrode roll 210” so that “the current collector-exposed portion [can] come in contact with the interior surface of the battery casing, thereby providing electrical connection between the positive electrode plate and the battery casing also functioning as a positive-electrode external terminal”, there is no apparent reason why a person of ordinary skill in the art at the time the invention was made would have modified Narukawa ‘133 and combined it with the disclosures of Vourlis and Narukawa ‘122 to arrive at the claimed embodiments of claims 1, 8, 14, and 20 because a person of ordinary skill in the art at the time the invention was made would have understood that moving the “two-side

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current collector-exposed portion” to the center of the “electrode roll 210” would have removed the electrical connection between the battery casing and the positive electrode. Furthermore, Appellants respectfully submit that a person of ordinary skill in the art would not have placed the “two-side current collector exposed portion” at the innermost layer because doing so would have reduced the amount of active material located within the volume of the battery, thereby reducing energy density.

The Advisory Action states, in relevant part:

In response to applicant’s arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Advisory Action also states, in relevant part:

Furthermore, In response to applicant’s argument that the reference does not disclose the tab is substantially the center of the battery unit on the innermost layer of the battery unit, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Appellants respectfully submit that the previously presented argument was intended to explain why a person of ordinary skill in the art at the time the invention was made would not have combined the references, when considered as a whole, to arrive at the claimed embodiments of claims 1, 8, 14, and 20. In particular, Appellants respectfully submit that the Examiner provides no articulated reasoning why such a combination would have been obvious when none of the references appears to disclose the above discussed features of the claims.

Therefore, Appellants respectfully submit there is no apparent reason why a person of ordinary skill in the art at the time the invention was made would have combined the cited references to arrive at a first electrode tab “disposed at substantially the center of the battery unit, on an innermost layer of the battery unit” of the claimed embodiments of claims 1, 8, 14, and 20.

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As such, Appellants respectfully request that the Examiner's rejections of these claims be reversed.

Because claims 2, 3, and 24–26 depend, directly or indirectly, from claim 1, they each incorporate all the terms and limitations of claim 1 in addition to other limitations which further patentably distinguish these claims over the cited references. Therefore, Appellants respectfully request that the Examiner's rejections of claims 2, 3, and 24–28 be reversed.

B. Narukawa '133, Vourlis, and Narukawa '122 do not disclose or suggest the limitations of dependent claims 5, 6, 12, 21, 22, 27, and 28

Because claims 5 and 6 depend, directly or indirectly, from claim 1; claim 12 depends directly from claim 8; claims 27 and 28 depend, directly or indirectly, from claim 14; and claims 21 and 22 depend, directly or indirectly, from claim 20, they each incorporate all the terms and limitations of their respective base claim in addition to other limitations which further patentably distinguish these claims over the cited references. Therefore, Appellants respectfully request that the Examiner's rejections of claims 5, 6, 12, 21, 22 be reversed.

C. Conclusion

In light of the foregoing, Appellants submit that all of the pending claims 1–3, 5, 6, 8, 12, 14, 20–22, and 24–28 are allowable over Narukawa '133, Vourlis, and Narukawa '122. Accordingly, Appellants respectfully request that the Examiner's rejections of claims 1–3, 5, 6, 8, 12, 14, 20–22, and 24–28 be reversed and that the case be remanded to the Examiner for allowance of the claims.

8. CLAIM APPENDIX

1. A battery unit comprising:

a first electrode plate having a first electrode current collector with a first electrode tab, and a first electrode active material layer coated on at least one surface of the first electrode current collector;

a second electrode plate having a second electrode current collector with a second electrode tab, and a second electrode active material layer coated on at least one surface of the second electrode current collector; and

a separator that is interposed between the first electrode plate and the second electrode plate, wherein,

the first electrode tab is formed by folding a cut portion of an uncoated area of the first electrode current collector toward an upper edge thereof,

the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector, and a fold extending from the side edge to the cut, and

the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, at an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.

2. The battery unit of claim 1, wherein the first electrode tab is disposed at a winding start portion of the first electrode current collector.

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3. The battery unit of claim 1, wherein the second electrode tab is disposed at a winding completion portion of the first electrode current collector.

4. (Canceled)

5. The battery unit of claim 1, further comprising an insulating tape adhered to either surface of the first electrode tab.

6. The battery unit of claim 5, wherein the insulating tape is interposed between inner and outer surfaces of the first electrode tab.

7. (Canceled)

8. A method of winding a battery unit comprising:

forming a first electrode plate having a first electrode current collector with a first electrode tab formed at a winding start portion of the first electrode current collector, wherein the first electrode tab is formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, and the cut portion is defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than

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half of the width of the first electrode current collector, and a fold extending from the side edge to the cut;

forming a second electrode plate having a second electrode current collector with a second electrode tab attached thereto;

preparing a separator interposed between the first and second electrode plates; and

winding the first and second electrode plates together, with the separator interposed therebetween,

wherein the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.

9.-11. (Canceled)

12. The method of claim 8, further comprising an insulating tape adhered to either surface of the first electrode current collector.

13. (Canceled)

14. A lithium secondary battery comprising:

a battery unit having a first electrode plate having a first electrode tab, a separator and a second electrode plate of an opposite polarity to the first electrode plate, the second electrode plate having a second electrode tab, sequentially disposed;

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a can having a space in which the battery unit is housed; and

a cap assembly connected to an upper portion of the can, and having a cap plate and an electrode terminal connected to the cap plate through a terminal throughhole formed in the cap plate and having a gasket at an outer surface for insulation from the cap plate, wherein,

the first electrode plate includes a first electrode current collector having a first electrode tab formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, and a first electrode active material coated on at least one plane of the first electrode current collector, the cut portion being defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of a width of the first electrode current collector, and a fold extending from the side edge to the cut, and

the second electrode plate includes a second electrode current collector with a second electrode tab attached thereto, and a second electrode active material coated on at least one plane of the second electrode current collector, and

the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.

15.-19. (Canceled)

20. A battery unit, comprising:

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a first tri-functional electrode unit comprising a first electrode plate having a first electrode current collector with a first electrode tab, and a first electrode active material layer coated on at least one surface of the first electrode current collector;

a second tri-functional electrode unit comprising a second electrode plate having a second electrode current collector with a second electrode tab, and a second electrode active material layer coated on at least one surface of the second electrode current collector; and

a separator interposed between the first tri-functional electrode unit and the second tri-functional electrode unit, wherein,

the separator is interposed between the first electrode plate and the second electrode plate,

the first tri-functional electrode unit and the second tri-functional electrode unit are wound, with the separator therebetween, to form the battery unit,

the first electrode tab is incorporated into the electrode current collector in an area of the first electrode plate where the corresponding electrode active material layer is not coated,

the first electrode tab is formed by folding a cut portion of the first electrode current collector toward an upper edge thereof, the cut portion being defined by a portion of a lower edge of the first electrode current collector, a portion of a side edge of the first electrode current collector that extends from the lower edge, a cut that begins at the lower edge and extends along more than half of the width of the first electrode current collector, and a fold extending from the side edge to the cut, such that the first electrode tab extends past the upper edge of the first electrode current collector, is disposed at substantially the center of the battery unit, on an innermost layer of the battery unit, and partially overlaps and faces the second electrode tab.

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21. battery unit of claim 20, further comprising an insulating tape adhered to either surface of the first electrode tab.

22. The battery unit of claim 21, wherein the insulating tape is interposed between the inner and outer surfaces of the first electrode tab.

23. (Canceled)

24. The battery unit of claim 2, wherein the first electrode tab prevents deformation of the battery unit.

25. The battery unit of claim 2, wherein material cost of the battery unit is minimized by forming the cut portion in the winding start portion and folding upward to form the first electrode tab.

26. The battery unit of claim 2, wherein the first electrode tab provides for a lower internal resistance, as compared to an electrode tab made of a different metal than a corresponding electrode current collector.

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27. The battery unit of claim 14, further including a plurality of insulating tapes attached to both surfaces of the first electrode current collector, to prevent an electrical short-circuit between the first and second electrode plates.

28. The battery unit of claim 27, wherein the plurality of insulating tapes are attached to both surfaces of the first electrode tab, to prevent electrical short-circuit due to burring of the first electrode tab.

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9. EVIDENCE APPENDIX

None.

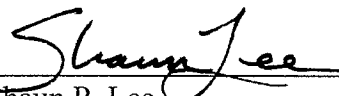
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10. RELATED PROCEEDING APPENDIX

None.

Respectfully submitted,

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SPL/spl

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